(12) UK Patent Application (19) GB (11) 2 138 048 A

(43) Application published 17 Oct 1984

(21) Application No 8408025

(22) Date of filing 28 Mar 1984

(30) Priority data
(31) 8308899 (32) 31 Mar 1983 (33) GB
8314955 31 May 1983

(51) INT CL³
E04H 12/22

(52) Domestic classification
E1D PB

(56) Documents cited
GB 1227920 GB 0657597 GB 0443806
GB 1187604

(58) Field of search
E1D

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(54) Post support structure

(57) A ground-engaging post support structure (10) includes a tube (11) sunk into the ground, usually but not necessarily vertically, and a separate stabilizer (12) which engages the tube (11) at ground level and has outwardly extending arms (14) which are engaged with the ground and can apply a force to the tube (11) tending to resist departure of the tube (11) from its desired disposition. The lower end of the tube (11) can have an inwardly extending flange or rim or can have a pointed cap to make sinking easier. The arms (14) can be in the form of vertical blades. A variety of stabilizers are described and shown in the drawings.

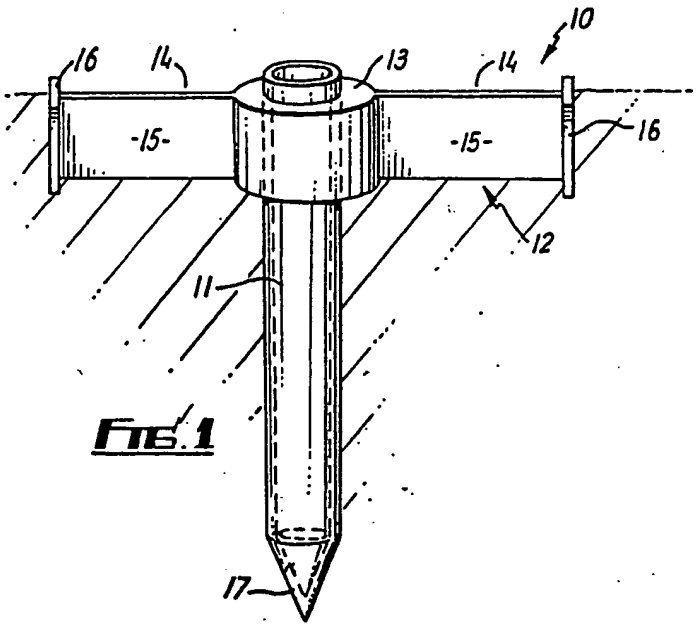

FIG.1

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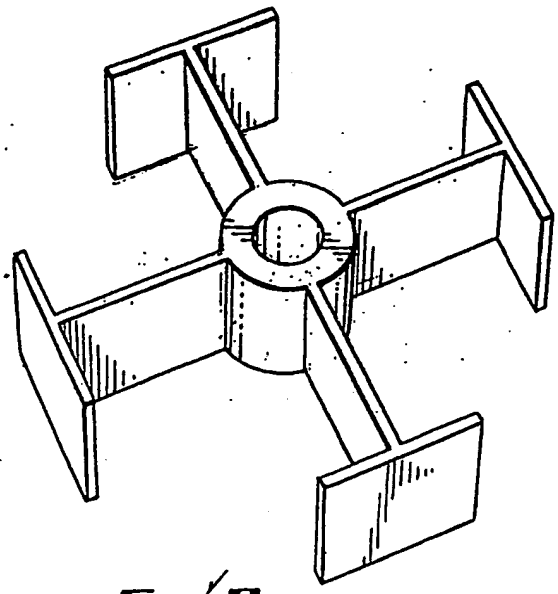

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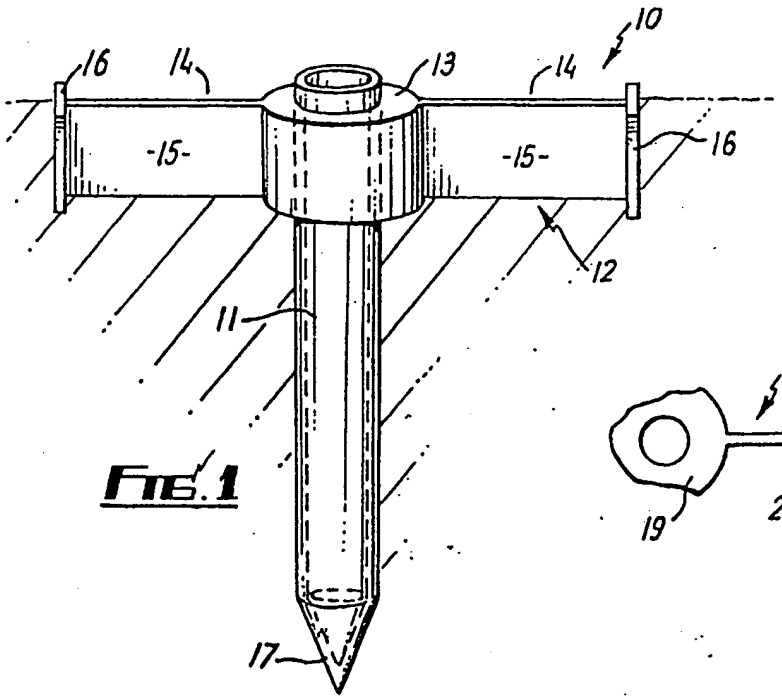

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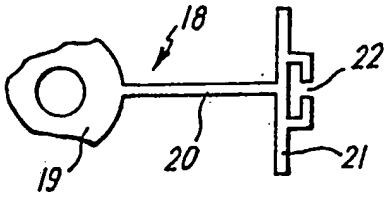

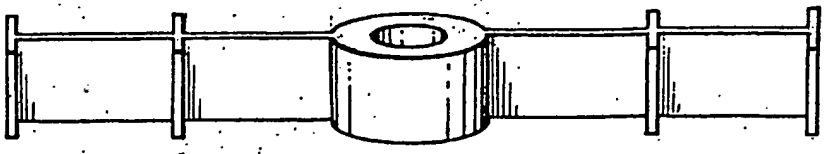

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FIG.4

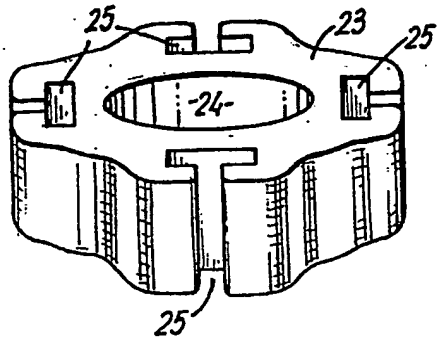
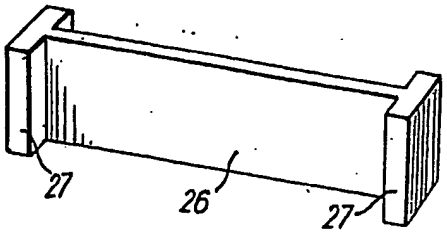


FIG.5



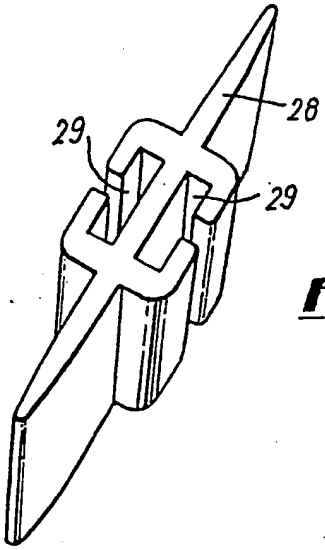


FIG.6

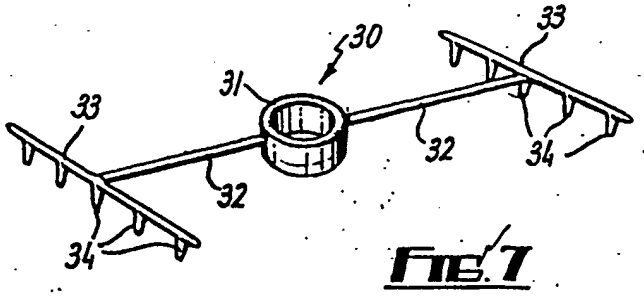
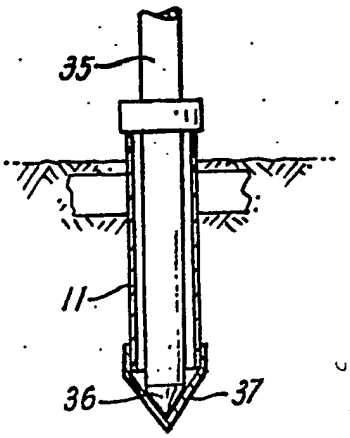


FIG.7



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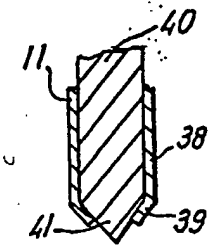

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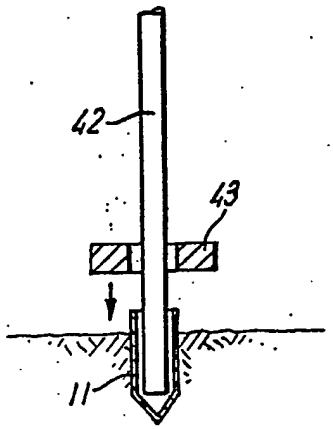

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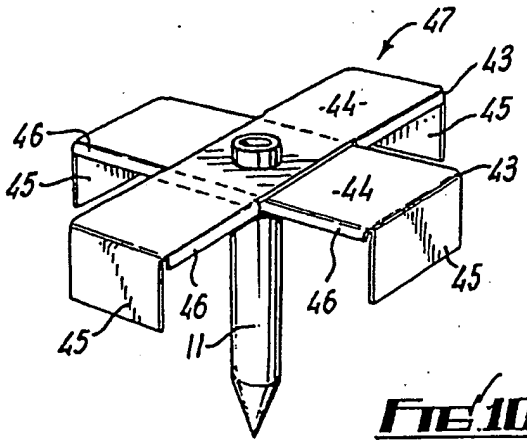

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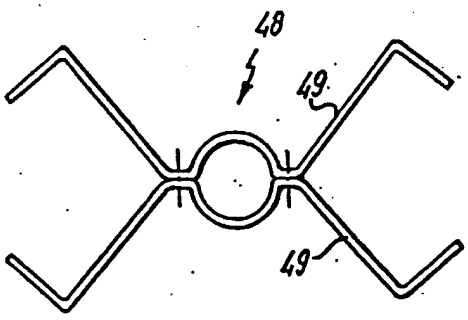

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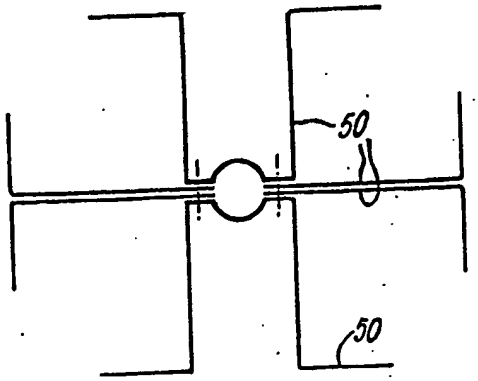

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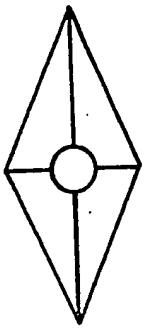

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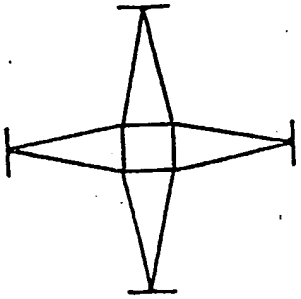

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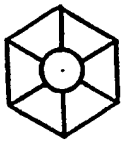

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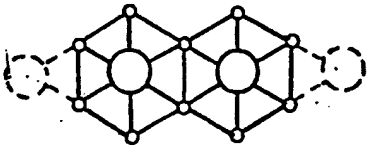

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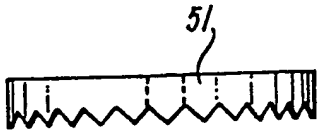

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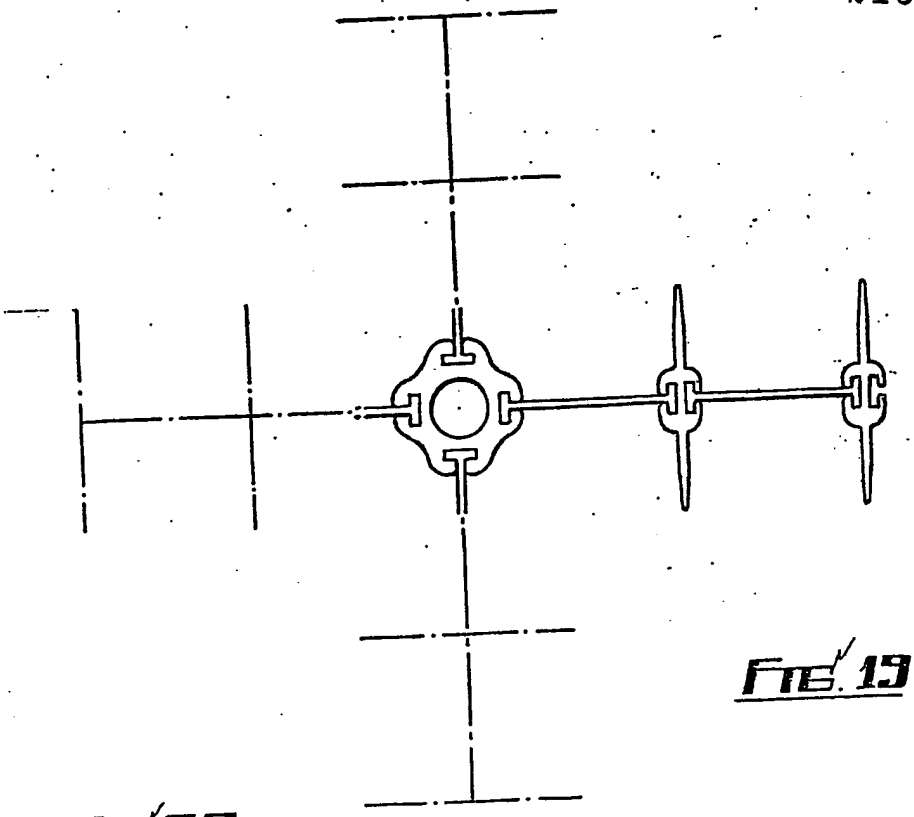

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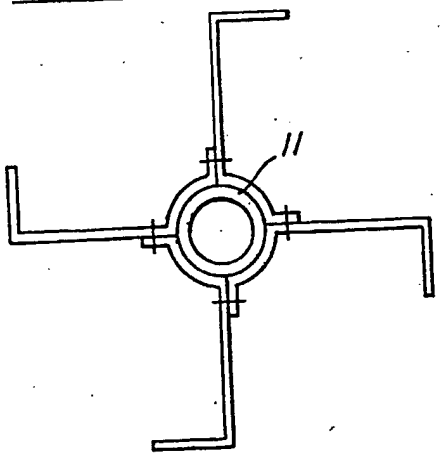

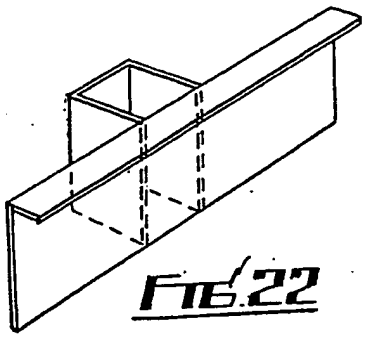

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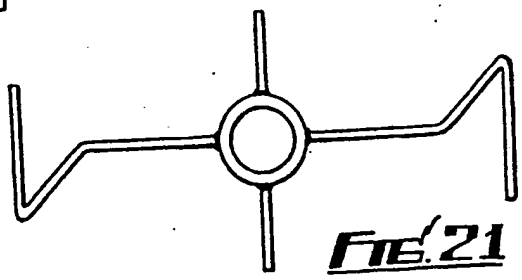

Фиг.21

SPECIFICATION

Post support structure

The present invention relates to a structure which can be engaged with the ground to provide a support for a post which can support a sign or the like or can be part of a fence or similar arrangement.

Such structures are known, for example from the following prior patent specifications.
EP 11197 (SILBERNAGEL)
WO 80/2173 (TRAUFLER)
UK 2104935 (HOWSON)
UK 2068037 (KINGSMERE)
UK 2032486 (HUNTING)
1227920 (NUNEATON)
1112918 (COPPEL)
1098555 (BERAERT)

The structures disclosed in these documents all have drawbacks of various kinds. For example, simple steel sockets, although easy to sink, may well be driven in at an angle to the vertical; straightening after sinking usually loosens the socket and encourages failure of the anchorage in use. Structures having integral ground-penetrating blades or ground engaging flanges are bulky and relatively heavy and if not driven vertically are difficult to straighten without disturbing the ground sufficiently to weaken the anchorage.

An object of the present invention is to provide an improved post supporting structure.

Accordingly the invention provides a ground engaging post support structure comprising a tube sunk into the ground to provide a socket and a separate stabilizer surrounding and engaging the tube at ground level and including a plurality of arms extending outwardly of the tube and penetrating the ground to be capable of applying a movement resisting force to the tube.

The invention provides a method of forming a post support structure comprising sinking a tube into the ground to form a socket and subsequently arranging a separate stabilizer to engage the socket at ground level and compelling outwardly extending arms of the stabilizer into engagement with the ground.

The invention will be described further, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is an elevation of a first preferred structure of the invention;

Figure 2 is a perspective view of a stabilizer of a structure of the invention;

Figure 2*a* illustrates a modification of the stabilizer of Figure 1 or 2;

Figure 3 is a perspective view of a further stabilizer;

Figures 4,5 and 6 are perspective views of components of a composite stabilizer;

Figure 7 is a perspective view of a further possible stabilizer;

Figure 8 shows a step in the sinking of a tube of a structure of the invention;

Figure 8*a* shows a variation wherein the lower end of the tube has an inwardly extending skirt;

Figure 9 shows the tube sunk, a post inserted and a stabilizer being added;

Figure 10 shows a further combination of tube and stabilizer;

Figure 11 shows another possible stabilizer construction;

Figure 12 is a schematic plan view of yet another possible stabilizer;

Figures 13 to 16 show further possible composite stabilizer arrangements;

Figure 17 shows a network of interconnected composite arrangements;

Figure 18 is a side elevation of an annular outer stabilizer part;

Figure 19 shows schematically a further variation of stabilizer;

Figure 20 shows a yet further possible stabilizer; and

Figures 21 and 22 show further forms of stabilizers.

Referring firstly to Figure 1, a preferred post-supporting structure 10 of the invention is comprised of a tube 11 and a stabilizer 12. The tube 11 is driven into the ground by means of a drift or podger (Figure 8) and forms an upright socket for receipt of the lower end of a post. The tube 11 will normally be sunk vertically for supporting a post for a notice board or fence, but for some purposes, for example a sound-deflecting fence, the tube may be sunk at an angle to the vertical. For a tube about 35 or 50 mm in diameter or side and normal soil the tube can be driven directly into the ground. For larger sizes, e.g 75 mm diameter or side, an auger or the like may be used to pre-drill a receiving hole somewhat smaller than the tube cross-section. The tube 11 may be circular in cross-section, rectangular, or of any other convenient shape. The tube 11 is sunk so that its upper end is level with or just above the ground. A projection of the upper end above the ground protects a wooden post against rotting at ground level.

After sinking, the orientation of the tube 10 can be checked and adjusted to be vertical if necessary. Next the stabilizer 12 is assembled to the tube 10 with a central boss 13 thereof closely surrounding the tube 10. Arms 14 of the stabilizer 12 extend outwardly and are in the form of vertical blades 15, having cross-pieces 16, which can be of sheet metal and sharpened and/or serrated along their lower edges. The stabilizer 12 is pressed or driven downwardly to penetrate the ground and form a firm anchorage which resists tilting of the tube 11 due to wind or other forces applied by the post. The fact that the stabilizer 12 is separate from the tube 11 means that the stabilizer 12 can be very easily installed with-

out disturbing the tube 11. The central boss or collar 13 can be of a size to effect compaction of loosened soil closely surrounding the tube 11 to make a more secure support.

Figure 1 shows the bottom of the tube 11 in the form of a conical point 17 integral with the tube 11. This can be omitted in some circumstances, for example in light soils when the tube can be easily sunk whilst simply surrounding a drift or podger. Alternatively, a cap can be provided or the tube can have an inwardly extending skirt. These possibilities will be described later.

Figure 2 shows a cruciform stabilizer comparable in construction to that of Figure 1.

Figure 2*a* shows a different type of stabilizer 18 having a central boss 19 and a plurality of radial arms 20 having cross pieces 21 and sockets 22 for receipt of additional stabilizer parts.

Alternative configurations of sockets may be provided to cooperate with triangular, cylindrical, Z-shaped or other shaped additional stabilizer parts.

Figure 3 shows a stabilizer similar to that of Figure 1 but having additional cross-pieces.

Figures 4, 5 and 6 show components of a composite stabilizer comprising: a boss 23 having a central bore 24 and angularly spaced T-slots 25; an arm 26 having T-shaped ends 27; and a cross piece 28 having T-slots 29. A plurality of arms 26 can be assembled to boss 23 and have cross pieces 28 attached thereto. The individual components of this stabilizer can be driven into the ground separately, requiring less force individually and not disturbing other parts of the stabilizer.

The slots 25 and ends 27 may have different configurations to those shown in the Figures. For example, the ends may be cyli drical, spirally coiled, Z-shaped or triangular, the slots 25 being correspondingly shaped to engage the ends. Furthermore the boss is not restricted to provisions of four slots.

A kit of interchangeable components may be provided in accordance with this invention. Different arrangements of stabilizers may be constructed *in situ* from such a kit without any need for elaborate tooling.

Figure 7 shows a stabilizer 30 having a boss 31, to radial arms 32 and spiked cross pieces 33. Spikes 44 of cross pieces 33 can be driven into the ground when the stabilizer 30 has been placed over the tube 11.

Figure 8 illustrates a tube 11 bei g sunk into the ground 12 by means of a drift or podger 35 having a conical point 36. The lower end of the tube 11 has been closed by a sheet metal cap 37 which need not have any great strength, but sufficient to prevent earth from entering between podger 35 and tube 11. Figure 8*a* illustrates in a cross-sectional sketch how the lower end of the tube wall 38 can have an inwardly extending skirt 39 for the same purpose and for use with a podger 40 having a point 41.

Figure 9 shows a post 42 installed into the socket formed by the tube 11 and having a schematically illustrated stabilizer 43 being installed.

Figure 10 shows a modified structure comprising a tube 11 and a stabilizer 47 comprised of a pair of inverted U-shaped sheet metal members 43 each having a flat horizontal body 44 and depending limbs 45. Lateral edges of the bodies 44 can have depending flanges 46. The structure of Figure 10 is used in precisely the same way as the earlier described structures.

Figure 11 shows in plan view, a further possible stabilizer construction 48 made of sheet metal components 49.

Figure 12 shows a stabilizer in plan view made from sheet metal blade-like components 50 united by bolts or by welding.

Figures 13 to 16 show further possible composite stabilizers consisting of lattices assembled from separate components in the manner described in relation to Figures 4, 5 and 6.

Figure 17 shows a network of components assembled to form a chain of stabilizers. The network not only serves to support a line of posts but also serves to stabilise the soil in the vicinity of the posts. This is useful to restrain erosion on embankments and in other exposed locations.

The arms may form a modular interconnected lattice secured laterally to the surface of the ground by embedment and by tines (e.g. spikes, screws, spades etc), which extend through the lattice into the ground from the surface. Such a lattice may provide a surfaceable or mechanically mountable ground gripping mat of any size that may be required.

Figure 18 shows an annular component 51 which can form a periphery of such a lattice, being united by arms (not shown) to a central boss like that of Figure 4; Figure 19 shows a modified form of composite stabilizer made up from the components of Figures 4 to 6; and Figures 20 and 21 show variations of stabilizers comparable in construction and function to those of Figures 11 and 12.

Figure 22 shows a further variation which may be easily constructed from sheet material. A horizontal flange is provided to strengthen the stabilizer against lateral forces.

The arms of stabilizers in accordance with this invention may be arranged to be rigid or flexible. A degree of flexibility is useful for many applications, because lateral forces applied to the post do not usually dislodge the ends of the arms. The flexibility of the latter serves to return the post to the original position when the force has been removed.

Post supporting structures in accordance with this invention may be constructed from metal, plastics, or other materials. In particu-

lar the different components of the structures may be composed of different materials according to their mechanical requirements.

The invention is not restricted to the embodiments illustrated and described above; modifications and alterations of detail can be made within the scope of the invention defined in the appendent claims.

CLAIMS

1. A ground engaging post support structure comprising a tube sunk into the ground to provide a socket and a separate stabilizer surrounding and engaging the tube at ground level and including a plurality of arms extending outwardly of the tube and penetrating the ground to be capable of applying a movement resisting force to the tube.

2. A structure as claimed in claim 1 wherein the tube is sunk into the ground in a vertical position.

3. A structure as claimed in claim 1 or 2 wherein the tube is circular in cross-section.

4. A structure as claimed in claim 1 or 2 wherein the tube is rectangular in cross-section.

5. A structure as claimed in any preceding claim wherein the lower end of the tube is shaped to make ground penetration easier.

6. A structure as claimed in claim 5 wherein the lower end of the wall of the tube is inwardly and downwardly inclined.

7. A structure as claimed in any of claims 1 to 4 wherein the lower end of the tube has a pointed cap.

8. A structure as claimed in claim 7, wherein the cap is of sheet metal.

9. A structure as claimed in any preceding claim wherein the arms have spikes extending downwards into engagement with the ground.

10. A structure as claimed in any of claims 1 to 8, wherein the arms are in the form of or incorporate vertical blades.

11. A structure as claimed in claim 10 wherein the or each blade is serrated.

12. A structure as claimed in claim 10 or 11 wherein one arm has one or more cross pieces in the form of a blade or blades.

13. A structure as claimed in any preceding claim wherein the stabilizer includes a central collar having a through-hole for the tube and operative, upon installation of the stabilizer to compact earth immediately surrounding the top of the tube.

14. A structure as claimed in claim 10, 11 or 12 wherein each blade is generally L-shaped in cross-section, having a major vertical limb in the ground and a minor horizontal limb on the ground surface limiting ground penetration of the vertical limb.

15. A structure as claimed in any of claims 1 to 8, wherein the stabilizer comprises a plurality of inverted-u-shaped members of sheet material having a major horizontal body centrally perforate and surrounding the tube and minor downwardly extending and ground-engaging blade-fform limbs.

16. A structure as claimed in claim 15, wherein two such members are provided and arranged at right angles to each other.

17. A structure as claimed in claim 15 or 16, wherein one or both lateral edges of one or more of the members has a short vertical skirt.

18. A structure as claimed in any preceding claim, wherein two or more of the arms are interconnected by one or more further ground-engaging integers to form a lattice.

19. A structure as claimed in claim 18 wherein the further integers are separate from and attached to the arms.

20. A structure as claimed in claim 18 or 19 wherein one such further integer extends between the arms of two spaced apart structures to form a link between adjacent structures in a fence line of posts.

21. A method of forming a post support structure comprising sinking a tube into the ground to form a socket and subsequently arranging a separate stabilizer to engage the socket at ground level and compelling outwardly extending arms of the stabilizer into engagement with the ground.

22. A method as claimed in claim 21 wherein the tube is sunk directly into the ground.

23. A method as claimed in claim 21, wherein a hole is drilled before sinking the tube.

24. A method as claimed in claim 23 wherein the hole has a smaller cross-section than the tube.

25. A method as claimed in any of claims 21 to 24 wherein the tube has its lower side walls inwardly and downwardly inclined and driving is effected to using a pointed drift within the tube.

26. A method as claimed in any of claims 21 to 24 wherein the lower end of the tube has a pointed cap and driving is effected using a drift having a point complementary to the cap.

27. A method as claimed in any of claims 21 to 26 including the step of changing the disposition of the tube after sinking and before installing the stabilizer.

28. A method as claimed in any of claims 21 to 27 wherein the stabilizer has a central boss which is driven into the ground upon installation to compact earth immediately surrounding the tube.

29. A post supporting structure substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

30. A method of making a post supporting structure substantially as hereinbefore described.

Printed in the United Kingdom for
Her Majesty's Stationery Office, Dd 8818935, 1984, 4235.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.